3:Royal Institute of International Affairs U-4 (no date)1954 M1 Middle East
Hadhramaut 1112

Sultan formerly held the hereditary appointment of Zamindar of the Nizam of Hyderabad's Army Levy, which recruited largely from Quaiti territory. Mukalla town has even achieved a 'Nationalist Party', which fomented a serious riot in December 1950.[1] Farther east lies the large Mahri Sultanate of Qishn and of Socotra Island (pop. about 8,000); the resident adviser strongly urged the Sultan in 1950 to spend more time in his mainland territory instead of leaving it to a younger branch of his family, while the Sultan lived on Socotra.[2] The most important ruler in Wadi Hadramaut is the Kathiri Sultan of Sayun, who has his own armed constabulary. A number of lesser chiefs have for local security purposes their own tribal guards, whose maintenance is partly financed by the British Government. In addition, the Aden Government established in 1937 a force of Government Guards in the Western Protectorate, and three years later in the Eastern Protectorate the Hadrami Bedouin Legion, which was modelled on the Arab Legion of what has since become the Kingdom of Jordan.[3]

The assistance of a British Director of Agriculture and his staff is available to those rulers who desire it, and financial help has been forthcoming since 1947 under the Colonial Development and Welfare Act. It was proposed to expend £410,000 in 1951–2 (including £82,000 for agriculture); only £23,000 of this would come from local revenue, the remainder to be provided by the British Government.[4] Drought caused a serious famine in the Hadramaut in 1943 and another less serious one in 1948–9. The region's economy was formerly helped to a considerable extent by remittances from Hadrami emigrants who had prospered in the farther East, but political changes in Indonesia and in the Hyderabad state of India have adversely affected this traffic, and the British authorities have had recourse to a large-scale scheme of irrigation by diesel-engined pumps. In the Western Protectorate the development of irrigated agriculture on over 100,000 acres at Abyan (40 miles north-east of Aden Colony) was begun with help from Colonial Development and Welfare funds in 1947 and was becoming self-supporting by 1952. It is a partnership on the Sudan model between the tenants, who receive half the returns, the landowners (the local states or private landlords), and the board of management, who divide the other half. Long-staple cotton of the Egyptian kind had become the main crop by

[1] GB, Colonial Office, *Report on Aden for the years 1949 and 1950*, p. 60.
[2] ibid. p. 61.
[3] See A. M. Clark Hutchison, 'The Hadhrami Bedouin Legion', *Journal of the Royal Central Asian Society*, January 1950, pp. 62–5.
[4] See above, p. 112.

3:Royal Institute of International Affairs U-4 (no date)1954 M1 Middle East
Hadhramaut MM2

248 1950–1, with a quality considered equal to that of the Sudan, and a contract lasting until 1955–6 has been secured with the British Raw Cotton Commission. This irrigation has, however, [136] created a new problem in the establishment of a semi-permanent population of desert locusts where they were formerly sparse.[1]

Education

871 658 872 Until the opening of the Aden Protectorate College for the Sons of Chiefs in 1935 there had been no government provision for education. In the Hadramaut, and especially in the towns of Sayun and Tarim, traditional Islamic education had reached [212] a highly advanced stage about a century ago and produced a body of Islamic scholars; but in other parts of the Protectorate the people were mainly illiterate. Present educational policy is that, as each state becomes sufficiently advanced, it should be helped to set up a self-supporting department of education with village schools, central primary schools, and intermediary or secondary schools in the larger states. The number of pupils attending schools supervised by government or local government authorities had risen from not more than 100 in 1939 to about 6,700 by 1951. The total expenditure on education in 1949–50 was about £39,000, of which the Quaiti state contributed 54 per cent, the British Government 36 per cent, and the remaining states about 10 per cent. There were then 74 primary boys' schools, varying from the small Koran school to those of full primary status; about half received British financial help. The Aden Protectorate College for the Sons of Chiefs was being closed down as the newer primary schools reached the desired level. There were seven girls' primary schools in the Eastern Protectorate and one in the Western, with a total attendance of about 800. In each Protectorate there was one post-primary school, with Egyptian and Sudanese teachers on the staff. A junior secondary school at Ghail ba-Wazir near Mukalla was completed in 1950 to provide a two-years' course for the local administrative service, the police, and the army. Full secondary education in Aden Protectorate is unlikely for some years, but the new Aden College, a secondary school opened in 1951, receives boys from the Protectorate as well as from the Colony and will it is hoped eventually be developed to university standard. In 1950 ten Protectorate boys held scholarships in the Sudan, and some twenty from the Eastern Protectorate were studying in other Arab countries.

[1] Dr B. P. Uvarov, director of the Anti-Locust Research Centre, reported in *The Times*, 27 September 1952.

29:Dunn S-4 (1952)1952 MI Middle East :
Hadhramaut MM2

CHAPTER VIII

COTTON IN ARABIA

Arabia is divided into numerous groups, most of which are actually principalities. The boundaries of the subdivisions are indefinite and so is the authority of the local rulers in most cases. Some of these groups like to call themselves independent countries. One is called a kingdom. Some are called protectorates. The British have exercised the major influence over all these groups for 50 years and still do but in varying ways. One small spot of land actually belongs to the British Crown.

ADEN PROTECTORATE

The narrow strip of land along the southwestern tip of the Arabian Peninsula includes a number of territories and dependencies of Arab chiefs which have been organized under a protectorate treaty with the British, and is called the Protectorate of Aden.

The Protectorate is about the size of Arizona. It has about 660,000 people, many of whom are nomads. The country is mostly mountainous though there are a few valleys and flood plains capable of cultivation. The Food and Agriculture Organization estimates that there are about 270,000 acres actually in cultivation at the present time. As the plains receive only about four inches of rainfall annually, irrigation is required. Considerable water is available as rainfall in the mountains is rather heavy, approaching 40 inches annually, but facilities are inadequate for catching and directing the water.

The economy of the protectorate rests almost solely on agriculture. The principal crops are grains and some fruits, principally dates. While a small quantity of coarse grains is normally exported, the country usually imports about half its bread grain requirements.

COTTON

Cotton has been grown in this area in small quantities for hundreds of years, but never in commercial quantities until very recent years when British interests began promoting production.

The following article on the present status and prospects of cotton production in the Protectorate was written especially for this report by the research staff of the Empire Cotton Growing Corporation, London, with the collaboration of Major Congdon, Manager of the Abyan Board in the Aden Protectorate.

RECENT HISTORY

"During the last war to increase the production of food, the old Abyan irrigation system was reopened and the headworks were partially restored under the direction of the Department of Agriculture. The reclaimed areas were used mainly for sorghum, bulrush millet and simsim, but it soon became

29:Dunn S-4 (1952)1952 MI Middle East
Hadhramaut MM2

248 [241]

evident that a cash crop was needed to exploit fully the potentialities of the area and to make it self-supporting.

"A small quantity of X1730 A cottonseed was therefore introduced from Tokar in the Sudan in the 1946-47 season and though this was not successful in the first year, when tried again in 1948-49 it gave an average yield of some 1,750 lbs. of seed cotton per acre from an area of 80 acres. Production thereafter increased rapidly, reaching 1,500 bales of 400 lb. in the following year (1949-50) and 9,900 bales in 1950-1951.

METHOD OF CULTIVATION

"The system of irrigation used in Abyan resembles most closely, but is not identical with, that of the Gash and Tokar in the Sudan. After the rains in July-September the water flows down from the mountains in two wadis, the Bana and the Hassan, and is held by slightly bow-shaped bunds about 30 feet high with a base of some 50 feet. From these the water is directed by means of deflectors into rough canals and thence into the fields. Later the upper-most bund is broken and the water goes down to the next bund where the process is repeated. This is continued until eventually the unused water finds its way to the sea.

"Cotton is planted about 10 days after watering, in furrows made by an ox plough and is later thinned to leave single plants at a spacing of 1 metre by 1 metre. The plants, which rely entirely on the moisture in the soil at the time of planting, often grow to a height of 12-13 feet, and produce a good crop, with lint which is little, if any, inferior to that spun from similar cotton grown in the Sudan.

ABYAN BOARD

473
248

"In order to develop the irrigation system in Abyan, an Abyan Board was formed in 1947 representing the interests of the Department of Agriculture and the states concerned. The crops are grown on a cooperative basis, as in the Sudan, the proceeds being divided between the cultivator, the Abyan Board and the landowner. At present 50 per cent goes to the cultivator, 25 per cent to the Board and 25 per cent to the landowner. State taxes of 5 or 10 per cent are payable by the landlords, depending on the status of the land.

"The Board purchases the seed cotton from the cultivator at a fixed price, gins the seed cotton and sells the lint at present to the Raw Cotton Commission with whom a five-year agreement has been made. Any profit resulting from the sale of lint is used to continue the development and expansion of the scheme.

248

OTHER AREAS

"Cotton is also grown in the Ahwar, Lodar and Yeramis districts, and in Lahej, where a small cotton growing industry has existed for a long time, with asiatic and punctatum types predominating. These types are a potential source of danger to the improved types grown in Abyan, both on account of the risk of deterioration in seed through accidental crossing and the introduction of pests such as pink bollworm. Attempts are now being made to bring cotton cultivation in Lahej under control in order to minimize these dangers.

29:Dunn S-4 (1952)1952 MI Middle East
Hadhramaut MM2
Aden MM1

COTTON IN ARABIA

H 248 136 242

PESTS AND DISEASES

"At first, as was to be expected, the cotton crop as a whole was remarkably free from major pests and diseases, but these are now beginning to appear. Bacterial blight *(X. malvacearum)*, has not so far been evident, the land having started clean and the seed having been introduced from Tokar where the disease is not prevalent. The almost complete absence of rain during the growing season also makes any secondary spread of the disease unlikely.

"Jassids are present in small numbers and may tend to increase, and American bollworm *(Heliothis armigera)* is beginning to appear in quite large numbers in Abyan.

"At Lahej the most serious pests are the red bollworm *(Diparopsis castanea)* and the pink bollworm *(Platyedra gossypiella)*.

H 248

PROSPECTS

"It is unlikely that production of cotton in the Aden Protectorate will ever be on a very large scale as the area of land which can conveniently be flooded is limited. At present some 30,000 acres are in use in Abyan, of which 9,000 are under cotton and the target, when all proposed canals are finished, is about 50,000 acres, with cotton on about 20,000 acres in a good flood year. With developments in other areas the total area under cotton may be extended to 30,000 acres.

H 654 242

RESEARCH AND EXPERIMENTATION

"The Senior Entomologist of the Empire Cotton Growing Corporation, at the request of the Director of Agriculture, visited Aden in January 1951 to make a survey of the insect pest position, and the Corporation's senior officer in the Sudan is now spending half his time in Aden pending full time employment by the Abyan Board later. He has started selection work on the X1730 A seed from the Sudan and is arranging for regular supplies of pure seed to be produced in the area. In addition other strains are being tested in the variety trials and observation plots, including a strain of Wilds which matures very early and occupies the land for only six months. If this proves successful it might enable a food crop to be grown in the same year as the cotton crop.

"A Colonial office mission also visited Aden early in 1951 to examine the technical, agricultural and financial problems involved and to make recommendations for the development of the scheme and the establishment of any research work that may be needed."

A 101 [161]

ADEN

The crown colony of Aden located on a tiny peninsula on the coast of the protectorate actually dominates the area. Though the colony is only 75 square miles in area it has almost 100,000 people. The port of Aden has been an important trading center since the time of the ancients. This was the crossing point for the Abyssinians as early as 3,000 B.C. It was the final port of call for the Indian traders in the same century. It was also a chief port on the Indian trade route during the Roman times. Today Aden is the principal port and the commercial center for the entire Arabian Peninsula and one of the main crossing points for the African Moslems trekking to Mecca.

6:Gt. Brit., Colonial Office G-3 (1948) 1950 MM1 Aden
Hadhramaut MM2

Market Conditions

Food grain prices showed no reduction during the year. Prices at the main coastal centres of Aden and Mukalla fluctuated between £25 and £37 per ton, the higher rates being recorded in Mukalla towards the end of the year, when famine conditions were confirmed in the Hadhramaut. 435

The price of sesame seed fell from the high levels of 1947, and the price during the year varied between £60 and £70 per ton.

The Maria Theresa dollar exchange dropped 23½ per cent. at the end of the year, Rs. 186 being asked for 100 dollars.

Demonstration and Experiment

In the Hadhramaut the introduction of barley passed the third season; it may be claimed that the crop has found favour and that it is most likely to become well established in the economy of the country. The object of this introduction was to obtain a more dependable crop for winter sowing. Wheat was in the past the winter crop, and always a risky one owing to the danger of rust attacks. Barley in southern Arabia is regarded as a safer crop in all respects, but for some reason it escaped the attention of farmers in the Wadi Hadhramaut. 242 243 248

In Abyan cotton variety X1730A was grown on a field scale on Abyan Board tenants' land. The crop was sown on land inundated in August with approximately three feet of water. No other water was applied after sowing. At the end of the year, the crop appeared most promising.

Plant Introduction

Three-hundred and fifty apricot, 350 Japanese plum, and 24 peach trees were imported from South Africa, for sale to farmers on the Audhali Plateau.

One hundred citrus trees were imported from Eritrea, for planting and distribution in Abyan.

Development Schemes: The Abyan Board

Work on improvement of the systems of the Na'aza and Ba Tes canals was carried out in the first nine months of the year. A stone regulator at Ba Tes head an ' a series of stone drops and regulators were installed on this system and on part of the Na'aza system. Much work remains to be done, and in a manner which will allow of the improvement to be incorporated in the general plan of development [illegible] the area. 242 241

Following further examination of the area by Mr. N. Simansky, Irrigation Adviser, it was possible to submit an application for a loan of £250,375 from the Colonial Development and Welfare Fund. Sanction for this loan was obtained in July, and work started in the last quarter of the year. Machinery and cement were ordered, while local purchases were made from ex-War Department stocks held in Aden. At the end of the year, two Agricultural Officers, one of whom acted as manager to the Board, one British and three Italian surveyors, and one British accountant, together with a large Arab staff were employed on the scheme.

The development programme of the Board continued side by side with

7: Gt. Brit., Colonial Office G-3 (1949-50) 1951 MM1 Aden
Hadhramaut mm2

132 to make it one of the most favourable for many years. The rains of November and December were judged to have been the heaviest seen for thirty years.

731 Unfortunately the cultivator was in many areas, particularly the eastern districts, unable to make full use of these favourable conditions. This was the result of the bad season of 1948 which had caused famine in the Wadis 'Amd and Rakhya of the Hadhramaut, and continued to cause famine for the first four months of 1949. Famine relief and rehabilitation measures were largely responsible for getting farmers in these western Hadhramaut districts back to work, and by the end of the year there was little indication that a famine had existed in the early months of the year. In the Hadramaut important famine relief and famine prevention measures were adopted ; of outstanding importance was the introduction of a pump scheme financed by the States, and by the end of the year considerable progress had been made with this scheme. Conditions were severe in the 'Aulaqi districts of the Western Protectorate, but other districts, notably Abyan, had surplus grain stocks, and the districts which were short were able to draw on these supplies and move them, mainly by camel transport, to where needed.

653 248 The year 1949 saw great expansion in the Abyan scheme ; offices and staff buildings were built, supplies were accumulated, and important irrigation work was extended, particularly in the region of the Wadi Hassan. The year saw the emergence of Abyan as a successful producer of long staple cotton, and the harvest from some 82 acres (which averaged 1,750 lb. of seed cotton to the acre) was ginned on a roller gin in Abyan, pressed on a hand press in Aden, and exported to Liverpool for sale to the Raw Cotton Commission. Planting for the 1949–50 crop was extended to over 1,000 acres.

Rainfall, Crop and Livestock Conditions

132 731 *Saif Rains Season.* An abundant Saif rain was received in almost all districts of the Protectorate in 1949. In parts of the Eastern Protectorate the rains came late, but were heavy ; and in the Hadhramaut considerable destruction was caused to irrigation works from the resulting floods. The great Nuqra Dam, which had stood successfully for the previous two flood seasons, received the full weight of the combined floods of the Wadi 'Idim and Wadi Ser and was breached owing to a blow-up of the apron caused by excessive up-stream pressure.

241 The Saif rains were badly needed. They gave the cultivator, hard pressed through the previous bad season, a chance to grow grain and fodder crops with which to build up his condition in readiness for cultivation in the Kharif season.

132 *Kharif Rains Season.* Rain followed close on the finish of the Saif, and in almost all districts the rainfall was sufficient for the needs of the cultivator. In November, 1949, the Protectorate was blessed with that rare visitation, a general winter rainfall, which fell with exceptional heaviness, particularly in the north-eastern areas from Beihan across

7: Gt. Brit., Colonial Office G-3 (1949-50) 1951 MM1 Aden
Hadhramaut mm2

accounts section the position was particularly serious; but equally important was the lack of essential hydrological data on such matters as river discharges, the availability of suitable storage sites, studies on percolation and so on. Without such information progress must be delayed. 654

As mentioned earlier, the X1730A type of cotton planted on 82 acres in 1948, proved a great success. The crop was ginned and marketed by the Board, and arrangements with cultivators for the new season's planting resulted in an extension of the acreage to 1,097 acres. At the end of 1949 the crop showed great promise, and in many areas appeared even better than the previous year's crop. 248 242 654

Grain, oil-seed and fodder production was satisfactory, though grain yields were reduced in many areas through double-cropping the land with a sorghum fodder crop in the Saif season and then a grain crop in the Kharif.

A great deal of the land in Abyan which has been well irrigated for the past five years is now becoming heavily infested with weeds, mainly the weed grass *Desmostachya bipinnata*. The introduction of cotton as a cleaning crop and the "drying up" and resting with or without cultivation, of these heavily infested lands is now recognised as an urgent matter. In order to tackle the weed problem the Board increased its tractor strength by the purchase of three Fowler Diesel crawler tractors in the last quarter of 1949. 654 137 242

Another problem which came to notice towards the end of 1949 was the rapid rise in the height of the water table in certain areas. The area involved does not exceed 300 acres, but already in this area (where in places the water table has risen to within six feet of the surface) salts are appearing in the upper layers of the soil, and vegetation, particularly in the seedling stage, has been affected. It was noticed that cotton, once established, flourished and appeared exceedingly healthy on these salt-impregnated soils. 133 242

Anti-Famine Measures

In the first four-and-a-half months of 1949 until general rains fell over the Eastern Protectorate, famine again threatened human life in the Hadhramaut. Relief measures were introduced, as in the previous famine, but this time so promptly that practically no deaths from famine occurred. Again aircraft of the Royal Air Force came to the rescue and dropped grain supplies to the worst affected areas. Large quantities of grain were moved inland by motor transport and any camel transport that could be mustered; at the same time large numbers of the destitute, particularly women and children, were brought down or walked down to the coastal towns, where they were accommodated in refugee camps and fed. To employ labour on relief works an extensive programme of road construction, and irrigation repair works and new construction was undertaken. 731 [653]

When rain fell, it was again found necessary to issue loans to

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden
Hadhramaut MM2

The above figures are derived from estimates checked by sampling, except in the case of the long-staple cotton for which actual figures are available. 241

Outstanding yields of long-staple cotton have been obtained ; yields of one ton of seed cotton with a ginning out-turn of 36 per cent often occur. Yields of irrigated wheat and barley are generally high : wheat yields of 1½ tons per acre are common in the lift-irrigated districts.

Crop Processing

Cotton Ginneries. Long-staple cotton is ginned in two ginneries operated by the Abyan Board, and the total output in the 1951–52 season was 7,206 bales. At the end of 1952 plans were in hand to combine ginning equipment at one ginnery in Lower Abyan. 248 249

Oil Mills. Throughout the Protectorate sesame is crushed in primitive pestle and mortar crushers worked by camel power.

Marketing

Crops for domestic consumption are sold direct by the producer to the consumer, or through merchants, or at markets which are often weekly events in the villages and towns of the Protectorate. 443

Tobacco is exported from the Protectorate by merchants who trade in the Colony of Aden and Middle East markets. 439

Substantial quantities of fresh produce, vegetables and fruit are exported from the Protectorate to the Colony to be sold in the Colony markets.

No marketing boards for export crops exist, but the Abyan Board is at the moment in sole control of the grading, ginning and export of long-staple cotton grown in the Protectorate. 248

Research

Research on cotton and cotton breeding is carried on by the Abyan Board. 242

In the Hadhramaut, the Hadhramaut States contribute funds to an experimental area supervised by an officer of the Department of Agriculture. In this area, which was opened in 1952, investigations on crop production, crop varieties, treatments and water duties have been started.

In the Western Protectorate many varieties of deciduous fruits and citrus have been introduced over the past 14 years, and it is considered that there are sufficient trees in bearing to start on nursery propagation of suitable types. Initial trials have been made at a high-altitude demonstration area on the Audhali Plateau.

Control of Pests and Diseases

Since 1942 efforts have been made, generally with success, to control locust breeding in the Protectorate, which is subject to constant invasions by locusts from other areas. The control of covered smut of sorghum by the use of sulphur for seed treatment has been introduced to areas where damage from this plant disease is common.

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden
Hadhramaut MM2

Agricultural Extension and Improvement Schemes

654 The main development scheme for irrigated land use is that in Abyan. 248 A note on the scheme is given in Appendix I, page 84.

406 The extension work of the Department of Agriculture is carried on through departmental staff and through State agricultural departments 241 where these exist. Extension work at the moment is mainly confined to a few selected subjects such as cotton growing, fruit and vegetable growing, and lift irrigation by pump.

Cotton Growing Schemes (other than at Abyan). Long-staple X.1730A cotton was introduced for cultivation to the Yeramis district, and from an area of approximately 400 acres some 472,665 lb. of seed cotton were marketed.

In Ahwar, where X.1730A cotton was grown for the second season, 436,311 lb. of seed cotton were marketed from an effective area of 400 acres.

The Hadhramaut Pump Scheme. In the Hadhramaut there has been considerable development of lift irrigation by diesel-engine pumping units since 1948. It is claimed that 389 pump units with an estimated total horse-power of 3,640 have now been introduced. A large percentage of the units have been sold by the Hadhramaut States to local farmers on a deferred payment scheme.

In 1952 pump units irrigated 37 per cent of the total area under lift irigation in the Hadhramaut. The average area irrigated per pump unit is estimated at 8.3 acres as compared with 2 acres by animal lift. The yield from pump irrigated crops in nearly all cases is found to exceed comparable animal lift irrigated crops. The schemes may be criticised on account of the high horse-power used for the irrigated area, but on the other hand with less working hours per day the machinery should theoretically last longer.

Credit Facilities

452 In the Western Protectorate advances have been made through Farmers' Associations, through the Abyan Board and through local States to assist farmers. In the Eastern Protectorate, particularly the Hadhramaut, large sums of money have been advanced since 1944 to enable farmers, or groups of farmers, to maintain local irigation systems and to help farmers to buy pumping machinery by hire purchase. Little or no progress can be made in the development of agriculture without credit facilities.

Agricultural Department

647 The staff comprises the Director of Agriculture, four Agricultural Officers, one Assistant Agricultural Officer and nine Agricultural Instructors.

The Department is responsible for giving advice on agriculture and, in many areas, for the organisation and administration of agricultural development projects. During the financial year 1952–53 it budgetted to spend £19,000.

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden
Hadhramaut MM2

cotton, introduced in 1946, proved successful and this crop has now been chosen as the main crop for the area.

Payment for irrigation services has always been based on a crop share of 25 per cent payable to the Board. The present crop share and taxation on the crop, as laid down in an agreement dated 1st April, 1950, is as follows :

PARTY	LIVE LAND (*Land developed and cultivated for 5 years*)	DEAD LAND (*New land opened for cultivation*)
	%	%
State (Taxation) . .	5	10
Landlord . . .	20	15
Tenant . . .	50	50
Board . . .	25	25

To secure rapid development, traditional methods have been used while the land has been surveyed and existing canal systems aligned and new canals of improved design have been constructed. Diversion is still by traditional methods but regulators have been constructed in the upper part of the district.

Land and Water Rights

The Board does not own or control any land except building sites and experimental areas loaned from the local States and, in one case, rented from a landowner.

The Board controls the diversion and distribution of all flood water in the district. In the winter season the Board purchases the permanent flow of the Bana River from the Lower Yafai Sultan and his relatives and distributes this supply through the canal system to farmers who pay the customary crop share to the Board.

Tribal boundaries and settlements of title to the area have been ill defined in the past years of insecurity, but in 1951 final decisions were taken regarding tribal boundaries.

Survey

Since 1948 an area of 100,000 acres has been contour surveyed to a one metre interval. Geophysical surveys, the first as a reconnaissance and the second in fairly detailed form, have been made.

Irrigation Development

Development is in various stages. An area of approximately 50,000 acres of land is now controlled for irrigation farming, mainly on traditional lines. The normal flood flow to the area is expected to be sufficient to crop 30,000 acres yearly. In the 1951 flood a discharge of 224,000,000 cubic metre was observed to reach Abyan in the Bana River and this quantity, if correctly controlled, would have been sufficient for the irrigation of 50,000 acres. In actual fact only 30,000 acres were irrigated. The system is to direct flood water at speed, by diversion weirs made of brushwood and stone, into canals

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden
Hadhramaut MM2

654 which carry the water to bunded fields where the land is inundated to
312 approximately one metre in depth. In the lower part of the district complete diversion of the flood is made by larger earth dams built
241 across the river bed. Generally one metre depth of water is sufficient to raise the crops of sorghum, sesame and cotton, though summer planted crops which have to grow when water is low are given one or two supplementary irrigations.

The date of arrival of the floods is uncertain and the pattern of crop production may alter considerably according to the date of irrigation. For instance, early summer floods will only be used for sorghum fodder, grain, melons and sesame. Later summer irrigations are particularly required for cotton planting and for the autumn sown sorghum crop.

The Farming System

Skilled cultivation is carried on by settlers from many South Arabian tribes who have come to the area since the start of the scheme. Bunding of land, construction of field channels, ploughing and sowing are carried out by draught animals, mainly oxen though camels are brought in to help occasionally. No fertilisers are used at present ; the flood brings with it a heavy burden of silt which reaches the land and maintains its fertile state.

The basic problems concern the farming system. One is largely an irrigation problem caused by a rapid rise in the water-table which has taken place since irrigation was resumed. This rise in the water-table has caused an accumulation of salts in the upper layers of the soil, and has already made crop production on 2,000 acres practically impossible by flood irrigation methods. The other problem is weed control. As a gross area of 100,000 acres may be commanded in the future, and within this area an annual average of 30,000 acres may be cropped, it should be possible to afford long periods of fallow to land in order to reduce the dangers which may arise from heavy irrigation ; but individual ownership of land will greatly complicate such arrangements.

248 At the present time the cotton variety X.1730A, a derivative of
243 Sakel, is the main cash crop grown. All other cash crops in the
246 scheme are common to those of other irrigation tracts of a similar type in South Arabia though there are experimental crops, of which sugar is one. An important feature of the scheme is the need for a large area of sorghum for grain and fodder production. The draught animals depend almost entirely on sorghum fodder for their sustenance and the main food of the people is sorghum millet. It is expected that for some time two-thirds of the area will be maintained under sorghum and one-third under cotton.

Mechanical Equipment

406 The Board owns earth-moving machinery powered by diesel-engined
242 crawler tractors with carry-all scrapers, bulldozers, a ripper and grader and two drag-line scrapers. The policy of the Board is to increase the

8:Gt. Brit., Colonial Office G-3 (1951-52)1954 MM1 Aden
Hadhramaut MM2

mechanical equipment required for irrigation construction and maintenance in order to release work oxen for field operations. Up to the present shortage of equipment, break-downs and delays in obtaining spares have made it necessary to employ large numbers of working cattle on earth-moving and general irrigation works.

The Board also owns a fleet of twelve diesel-engined crawler tractors for ploughing work. Considerable difficulties have been encountered in maintaining this tractor fleet.

Administration of the Scheme

The present composition of the Board is :

British Agent, Western Aden Protectorate . .	Chairman.
Director of Agriculture, Aden Protectorate . . .	Managing Director.
Senior Political Officer, Southern Area	Director.
Two Representatives, (Fadhli State)	Members.
Two Representatives, (Yafa'i State)	
Manager, Abyan Board . .	Secretary.

The Board is responsible for the construction and maintenance of capital works and of main and minor canals ; the development of new land for irrigation ; the delivery of water to the land ; provision of marketing and credit facilities to farmers, when necessary.

The Board receives one-quarter share of the crops grown. This is now based on a cash payment of *Shs.*40 per effectively cropped acre for all crops other than cotton. The assessed amount is deducted from the cash payment made for the cotton crop.

The Board in the 1952–53 season made a cultivation advance of *Shs.*90 per acre of effectively established, thinned and cleaned cotton.

The Board provides seed-cotton packs and conducts weekly markets at convenient centres throughout the area. The cotton is classified at the markets by an expert cotton classifier. Each pack carries the grower's identification number, the weight as recorded at the sale and the market identification letter. A record is made of quantities sold at each market by growers and cash is paid after deduction of the Board's share. The cotton is ginned and baled in a ginnery equipped and run by the Board. The whole of the graded lint is sold under a long-term contract with the Raw Cotton Commission. The Abyan X.1730A is regarded by buyers as equal to Sudan grown crop of similar type.

Tenants make up and maintain bunds and field channels, cultivate specified crops as the Board directs, pay the crop share due, and deliver crops such as cotton to markets as directed.

Landlords, if owner occupiers, cultivate their own land and follow